

DARLINGTON'S

Mushroom News

A QUARTERLY JOURNAL FOR MUSHROOM GROWERS

Vol. VIII No. 2

OCTOBER 1960



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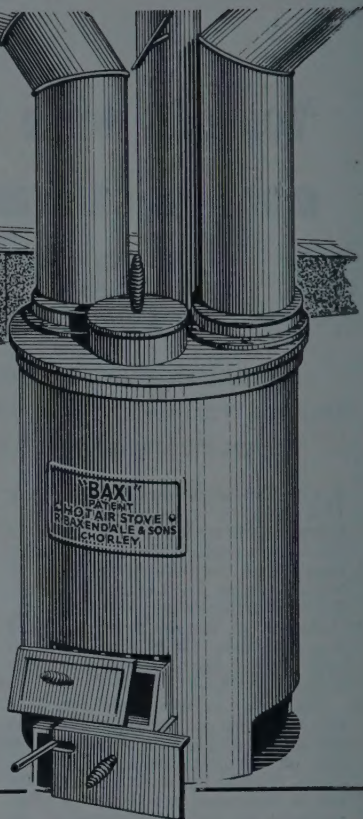


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OUR FRONT COVER

Picking and recording strain trials is a specialised job at Darlington's Experimental Farm at Angmering. There are always several hundred experimental plots in production and yields from each of these are daily recorded to the nearest tenth of an ounce.

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October 1960

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Sterling Quality!

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WORTHING ENGLAND

Vol. VIII No. 2

OCTOBER 1960

Outlook.

The volume of mushrooms reaching the markets of the United Kingdom continues to increase, partly as a result of the expansion of the industry as a whole, partly because more mushrooms are being grown from the same area of compost as a result of improved techniques such as heavier spawning, through spawning and greater understanding of the cultural requirements of the crop. Yields that not so very long ago might have been considered good for the whole cropping period are now picked in the first flush, and this too, on mass-production farms where not so very long ago small yields taken quickly were considered to be standard procedure.

Despite the vast increase—and there is really no other way of describing it—in the production of mushrooms, there has been no catastrophic fall in price as has often happened in other branches of horticulture when production has doubled or trebled in a short space of time. Prices have held up well in 1960 and some growers claim that their average so far is, in fact, a few pence up on 1959.

This satisfactory position can be attributed to three factors. Firstly, mushroom publicity has done much to condition the public by ensuring

that those who mould public opinion in culinary matters are thoroughly educated in the virtues of the mushroom. Working on a small budget a great deal has been done in the sphere of indirect publicity, and these efforts have paid good dividends. But the second factor, that of price, has had an equally important effect. There is no doubt that the periodic gluts of mushrooms in recent years leading at times to almost give-away prices, has done much to give the public a taste for mushrooms. Mushrooms bought regularly during a glut period break down resistance to higher prices later in the year. It may well be that the present prosperity of the mushroom industry is partly the result of conditions thought at the time to be devastating!

But the third factor contributing to the present satisfactory position is the prosperous state of the nation as a whole. Mushrooms have still a long way to go before they establish themselves as an essential item of diet. True, they are no longer looked upon as luxuries; but to a housewife counting her pennies and making up her shopping list, mushrooms do not rank with flour or sugar. It is mainly this category of housewife that the industry is supplying today, and not the upper income groups who

used to be the main purchasers of mushrooms, both direct and by way of restaurants.

Nevertheless, sales based broadly over the whole nation rather than on a narrow spectrum of a particular income group are much more vulnerable to the economic weather. The chef of the Coq d'Or *must* have mushrooms. Mrs. Smith need not have them if there are other things to attract her attention. Mushroom growers now have a very definite stake in national prosperity; a recession or slump could spell disaster!

It is well worth the grower bearing this in mind as he looks to the future. It may not be true to say that he has 'never had it so good' for there was a period in the past when the relatively few growers of those years could not go wrong. Today even the moderately efficient grower is in a sound position, and the very efficient grower is doing very well. But a

slight change in the wind of national prosperity could so easily reverse the situation and turn moderate profits into substantial losses.

Now is the time, therefore, for every grower to consolidate his position by increasing efficiency. He must concentrate on obtaining better yields from the same input, by improving his composting, for that is the key to success, by putting into practice new techniques that have been proved commercially to be beneficial, by better marketing of his produce. At the same time he must see where he can reduce the cost of production, not by short-sightedness in cutting costs just for the sake of it, but by careful study of every part of his production unit. Now is the time to invest capital in new heating plant, new ventilating systems, new machines, better insulation. It will be too late to think about doing so if the chill wind should begin to blow!

Notes and News

Protection

Dr. G. P. Wibberley, speaking at Wye College, claimed that the British grower was one of the least protected growers in Europe. Most countries had a tariff of 25%, where Britain had a basic tariff of 10%, and special duties only at specific times.

Liberalisation of trade to include Britain would hit glasshouse growers most heavily, and Dr. Wibberley went on to say: "The glasshouse section of the industry is too big for this country; there is too much old glass and the large growers will re-equip and expand at the expense of the small people."

Glasshouse Shading

Glasshouse shading by spraying the glass with a mist of coloured water is being tried by G. T. Scott, Ltd., of Eastbourne. P.V.C. spray lines will be fitted just below the ridge ventilators, and 250 gallons of dyed water will be flowing over the roof at the rate of 150 gallons a minute. The dye used is a green one specially prepared by I.C.I. and experiments had shown that the method made it possible to bring down the temperature of the house to within a degree or two of the outside temperature.

Pay Increase

A pay increase of 9/- per week for

NOTES AND NEWS—continued

farm workers has been announced by the Agricultural Wages Board. This brings the minimum weekly wage for men over 21 up to £8 9s. 0d., and with a 7/- increase for women, to £6 8s. 6d. The award will take effect from the 2nd January, 1961.

The cost to the industry in a full year will be £12½ to £13 million pounds, and it is estimated that the average wage, including overtime, that will be paid will be about £11 per week.

Horses.

Anything affecting the noble beast is of interest to growers and they will learn with regret that although the horse population of this country remains fairly stable, the total population for North America, Western Europe and Oceania has decreased from 26 million to 18½ million between 1949 and 1957.

When it is appreciated that 2½ acres of land are required to maintain a horse, the decrease of 7½ million horses means that an additional 19 million acres of good land have become available for food production for humans.

In Western Europe the increase in tractors in recent years has been phenomenal. In 1949 there was one tractor for every 400 acres of arable land. By 1957 there was one tractor per 150 acres!

A New Chairman.

Mr. T. Ainslie Robertson, who has been Chairman of the Governing Body of the Glasshouse Crops Research Institute at Taddington, since 1953, retired on the 1st October. His place has been taken by Sir William K. Slater, K.B.E., D.Sc., F.R.I.C., F.R.S., who has been Secretary of the Agricultural Research Council from May 1949 until June of this year.

Progress in Pre-packing.

Growers interested in pre-packing will be interested to learn that the National Standards Scheme for pre-packed potatoes is now under way. Twenty members of the Produce Pre-packaging Development Association are taking part in the scheme which, it is estimated, will turn over 1,000 tons of pre-packed potatoes a week.

A high standard has been set. Not only must the physical appearance of the potatoes be above reproach, but samples from every consignment must be cut and cooked. Availability of cooking facilities at packing station is a condition of taking part in the scheme.

Oh no!

From the U.S.A. we hear of a new tranquillizer to help plants through adverse weather conditions such as drought, cold snaps, or heavy rain. Responsible are a research team of the United States Rubber Company headed by Drs. A. E. Smith and A. W. Feldman.

Short Weight.

A University of Delaware study on the short weight problem in the U.S.A. revealed that 70% of the fresh mushrooms marketed in 4 quart baskets are short in weight. Some of the shortages occurred in mushroom packs that were only one day old.

Popular Pyrethrum.

The world demand for pyrethrum continues to increase, and during the current sales year no less than 91% of Kenya's anticipated minimum crop has been sold in advance. Production for the year ended 30th June, 1960, was 6,500 tons of dried flowers and the target for the present twelve months is no less than 10,000 tons.



The Brasserie at the Strand Corner House

MUSHROOMS AND THE CORNER HOUSE

Our roving reporter pays a visit to one part of the vast Lyons catering organisation to discuss the part played by mushrooms in the presentation of good food at reasonable prices. The fact that the Lyons Organisation absorbs some ninety tons of mushrooms annually makes the views expressed of considerable interest to all mushroom growers.

“**W**here mushrooms are concerned”, Mr. Paumier said, “it’s meat that sells them. Mushrooms and meat go together. As soon as rationing stopped and meat became more plentiful, the demand for mushrooms fairly jumped ahead.”

Alfred Paumier is the fourth in an unbroken line of chefs, and knows what he is talking about. As Food Technologist for Lyons Corner Houses he supervises the preparation and consumption of some *ninety tons* of mushrooms a year in the various restaurants that comprise the group. When it comes to meat, one Corner House alone — the Coventry Street

Corner House—requires one hundred and fifty prime steers a week to provide the grills and five hundred and fifty lambs for cutlets and chops.

Lyons Corner Houses have become an integral part of the London scene during the fifty years since the first of the famous restaurants was opened to the public. There must be few Londoners who have not at one time or another eaten a meal in one of the restaurants, and many visitors to the capital go to Lyons because they know they will get excellent food at reasonable prices. During the fifty years that the Coventry Street Corner House has been open

THE CORNER HOUSE—continued

the number of meals served, equals nearly one quarter of the world's population.

Obviously the Lyons organisation provides a tremendous bridge between producer and consumer. Put in its simplest terms, people 'go up West' for a night out and have a meal in a Corner House. They like what they eat, and if the lady is anything of a cook, she will remember the dish she chose. New recipes, new ingredients, new ways with old ingredients—these will remain in her memory and must influence her in her own kitchen. Consequently every grower and producer is affected to some extent by the way the Corner Houses approach the problem of providing meals for an increasing section of the public, a section that is also becoming much more discriminating.

Before the war the Corner Houses conformed to the traditional idea of the large restaurants, or 'halls' seating hundreds of people, served by waiters and waitresses bringing food from separate kitchens. Labour shortages during the war forced an extension of the canteen system, and afterwards it was decided to take a completely New Look at catering and offer services that would appeal to all classes.

Over £2,000,000 has been spent since the end of the war by Lyons on their Corner Houses and the theme of the development has been that the food should be cooked right in front of the customer, at the time he orders it, and that rather than have a few large restaurants there should be a number of small speciality restaurants.

The first of these was the "Bacon and Egg" restaurant opened at

Mr. Alfred Paumier, Food Technologist for Lyons Corner Houses.

Coventry Street. Here, in a kitchen open to the view of customers, cooks broke eggs into specially designed skillets, cooked them to perfection and sent them with the bacon to the customer on the skillet. It was an immediate success, and was followed by such speciality restaurants as the "Grill and Cheese", "Chicken Fayre", "Wimpy", "Salad Bowl" and the "Star Grill".

This new approach to popular catering has led to quite fantastic figures of consumption. The 3,800 pounds of mushrooms per week have already been mentioned. Add to these 55,000 steaks, 13,000 lamb cutlets, 1,500 lamb chops, 600 pork chops, 46,000 eggs and 2,850 pounds of bacon *per week*. For liquid refreshment, customers drink 9,000 gallons of tea and 7,500 gallons of coffee — and 5,600 bottles of wine!

However, to return to mushrooms, Mr. Paumier estimates that about 80% of the weekly intake of



THE CORNER HOUSE—continued

the Corner Houses are served as separate dishes; that is to say they are ordered as a vegetable to go with a main dish. This fact will be particularly encouraging to mushroom growers who have grown rather used to being told that restaurants use mushrooms as a garnish rather than provide them as a vegetable. It does, however, lead to a difficulty in that the mushrooms must be almost exactly the same size. When a customer orders mushrooms he expects to receive exactly the same quantity as the man sitting at the next table.

Consequently Lyons demand an exact standard of grading—a smallish cup to be precise. They require large quantities of graded mushrooms, and the grading must be not only accurate but also consistent, with guaranteed deliveries at daily intervals. It is doubtful if any one mushroom farm could produce the quantity of mushrooms of the right grade that the Corner Houses demand, and purchase through the markets from many suppliers is the only satisfactory answer.

Nevertheless, Mr. Paumier commented very favourably on the appearance of the mushrooms that we presented to him. As he pointed out, there is nothing looks more delectable than a fresh mushroom, but by the time they have reached the kitchens via the markets, they have lost much of their pristine freshness.

The Grill and Cheese at the Strand Corner House where the food is cooked in full view of the customers.

Lyons Corner Houses have established a new pattern of eating, not only for Londoners but also for the millions who come to London, whether for the day, the weekend or a holiday. People can now eat dishes that they once thought only existed on cinema or television screens and in the homes of the very rich, and yet pay a price that is reasonable and within their moderate incomes.

Mr. Paumier's

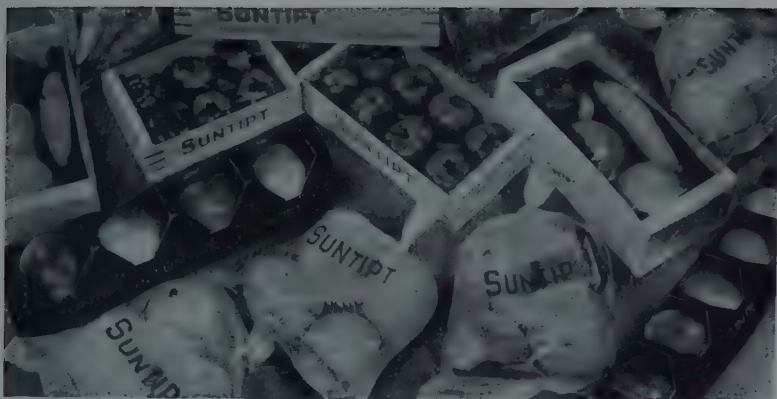
Favourite Mushroom Recipe

Wash them and drain well (do not peel), heat butter, about an ounce to the pound, in a shallow pan, add the mushrooms, season with salt and pepper. Gently toss occasionally until cooked; this takes about ten minutes, they should still be slightly firm with a "bite" in them and not well done and soft. Just before taking out of the pan, squeeze a little lemon juice over them and sprinkle with freshly chopped parsley, toss once again before serving.

If the mushrooms are small buttons leave them whole, larger ones cut into 2 - 4 - 6 or 8 according to size.



Mushroom News



BUILDING A MARKET

The problem of competing with foreign imports is one that must exercise the minds of all horticulturalists. In this article, the writer argues the case for accepting commercial discipline in the industry.

YOU often hear farmers say that they have a right to their own home market. And on the face of it, it sounds right enough. After all, most of us like to be seen around in national dress. Since we can't help looking like natives, we might as well eat the native food.

There is sense in it too. Think how the foreign stuff has had to travel. Over land; over sea. Through the tropics. Through the ports. Frozen solid to keep it from going bad. Packed green to ripen in the hold. Not within days or weeks of being fresh. Come to think of it, it is crazy we should prefer the imported

stuff to what we can buy over the farm gate, with the dew still on it. Well then, why doesn't the rest follow? Why does the farmer have to plead for his right to a market in which he enjoys natural advantages?

Service Sells.

The first point is that the overseas supplier, be he Commonwealth or foreign, is an "outsider". He has no inalienable right in our market. He knows it. He is there on sufferance. He is there because of the service he offers; and if he ceased to offer his own unique brand of service he would get no orders. Ask the housewife. Of course she is sentimental about home-cured bacon. She was brought up on it. This little pig

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BUILDING A MARKET—continued

went to market. But she buys Danish. She buys Danish because it is always the same. She can be sure of it.

Second point, then: the overseas supplier has a disciplined approach to our market. He sends his best; marked, packed and graded to a known quality. Behind Danish bacon; or New Zealand lamb, or Argentine beef, or Dutch tomatoes, there is an organisation that is fighting for the right to exist in our market—an organisation that has the duty of saying "No" to the producer back home whose stuff is not up to standard. It is an unpleasant duty; but it secures the right of the majority to go on selling. The producer understands this. He understands that his livelihood depends on producing what that arbiter of taste, the British housewife, wants for breakfast, dinner or dessert. Maybe he goes a stage further, and understands that his country's livelihood depends on it too. Because he understands, he conforms to the standard. He takes his freedom in other ways.

When the U.K. farmer says he has a right to his own market, he does not always think it through as far as this. He is an "insider", and it is a kind of birthright he is thinking about, like his birthright to be free. None of this slavish standardisation for him. None of this being bossed about by bureaucratic Boards.

Unfortunately—or is it fortunately?—there are still individuals who encourage him in this view—men who prefer the inconveniences, the dangers and the freedom of going it alone, men who still claim the right to live in constant apprehension of what may happen tomorrow. In farming, as often as not, they are men with a name in the

market for doing a good job, and in consequence, with a useful corner in it that they have built for themselves. They are against any mass attack by other producers on the home market, not only because they are individualists, but because there are no corners in a market that is fully and efficiently supplied.

Point three, then: the U.K. farmer is against organisation. What is that? The Marketing Board? Sure enough, he is in favour of those. But how does he regard them? As preservers of the *status quo*. As Maginot Lines. Does he accord them the freedom that he claims for himself? Not if he can help it. When they use their disciplinary powers, he jibs. He hobbles them with committees. He expects them to move at the pace of the rearguard. In a word, Marketing Boards are blunt instruments of mass-defence. Always? No, but *nearly* always.

The Way to Win

If the farmer is right, that he has a right to his own market, it is not, as he supposes, a prescriptive right, but a right that must be won and held against all comers. The tools are in his own hands. The Marketing Boards; the Co-operatives; the selling organisations that lack only one thing—life. He must give them life. He must give them freedom, which means foregoing some of his own. He must give them power—the power to make him toe the line, the power to refuse his product if it is not up to standard, the power to build a name and a place for him in his own market. Of course it will hurt. It will mean accepting commercial disciplines that he ignores when he talks of rights. It will mean adopting the standard of the best rather than defending the standard of the rest.

"Heat is like the domestic cat . . ."

A NEW INSULATING MATERIAL

Heat is like the domestic cat: when it's in it wants to get out and when it's out it wants to get in.

The mushroom grower's problem is, of course, to maintain the temperature at an even rate and to achieve this end involves him in considerable cost—not only in the form of initial outlay—but in the maintenance of the exterior heat reflecting surface. Frequent applications of aluminium paint are costly both as regards material and labour.

A thoroughly satisfactory and economical solution to this has been found by Mr. E. M. Sparkes, of E. M. Sparkes (Abbey Nurseries) Ltd., at Cokeham, Lancing in Sussex. Here, as in many similar places, glass houses have been converted into mushroom sheds. Mr. Sparkes has covered these with a layer of glass fibre and on top of this he places a new type of roofing felt that has an aluminium foil surface with a metallic lustre, capable of reflecting up to 95% of radiant heat. This material known as Silver Stormax, is produced by Engert & Rolfe, Limited, London, E.14. It is made in the same standard weights as bituminous roofing felts but the type generally preferred by mushroom growers is known as 1-Ply Silver Stormax weighing 30-lb. for 12 square yards. The cost of this grade works out at something under 2/0d. a square yard.

It will be seen from the photograph that the aluminium surface faces outwards, kept in position by wire netting over the roof and sides of the building, with battens fitted at regular intervals along the ridge and eaves. Mr. Sparkes believes that by adopting this method he achieves a far greater control of temperature both in winter and summer.

Before using Silver Stormax, Mr. Sparkes employed ordinary roofing felt which he used to spray with aluminium paint but he now reports that the new method is not only more efficient in that it reflects more heat, but it is also more economical, as there will now be no need to repaint at regular intervals.

Further tests show that Silver Stormax can also be used internally as well as externally, to retain heat in the building if the non-conduction system is suspect. Where the structure is already efficiently insulated, an external layer would be sufficient to reflect heat away from the building *and* provide the protection of a first-class roofing felt, for the house itself and any inner insulation layer of glass fibre, mineral wool, etc.

The manufacturers of Silver Stormax will quote for specific quantities and send a sample, on request.

A BUS ADVERTISES THESE

by

John Robertson Coupar

Mr. Frank Bleazard, a past Chairman of the Mushroom Growers Association, is one of the best-known of mushroom growers and has a high reputation for sound growing and common sense—a pair of virtues that usually ensure success. In this article are recorded some impressions of his method of growing.

Unusual advertisement on the back of a Blackpool (Lancs.) bus is a poster advertising mushrooms. The poster reads: "Try Mereside mushrooms grown by the Mereside Mushroom Co., Staining—YOUR FAVOURITE MUSHROOMS". The advertisement is paid for by Mr. F. Bleazard, owner of the Mereside Mushroom Co., at Mereside Nurseries, Staining.

Mr. Bleazard, who was chairman of the Mushroom Growers' Association in 1958-59, has two mushroom farms with a total growing area of 43,000 sq. ft., and 8,000 sq. ft. of spawn running rooms. He produces $3\frac{1}{2}$ crops a year and his annual yield is now approximately 258,000 lb.—6 lb. per square foot.

Originally, Mr. Bleazard was in the dairy business, selling something like 3,000 gallons of milk a day. Then the last war came along, bringing with it a cry for more and more home-grown food. Mr. Bleazard decided to do his bit by forcing rhubarb in a disused building. When his next-door neighbour suggested he should try mushrooms, Mr.

Bleazard took his advice and the very first crop he put down yielded $2\frac{1}{2}$ lb. per square foot.

In 1943 he bought Mereside Nurseries, which was at that time being used as a nursery. There he grew lettuce, tomatoes and chrysanthemums.

But Mr. Bleazard's first introduction to mushrooms in that old, disused building had caught his imagination. Once the war was over, and he was free to grow what he liked, it was not long before he turned to producing mushrooms on a commercial scale.

In 1946 he converted chicken huts and glasshouses on the nursery into mushroom units. The glasshouses were covered with bitumen bonded Fibreglass and then flat asbestos sheeting, three-sixteenths of an inch thick, was laid on top. The chicken houses — nine of them — were similarly sealed by means of Fibreglass and felt. The converted chicken huts are each approximately 24 feet long by 12 feet wide and account for 4,000 sq. ft. of the growing area.

Mushrooms are grown on the shelf system in the chicken huts, but trays are used in the glasshouses. The

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MUSHROOMS

Mr. Frank Bleazard



trays are non-returnable boxes, bought from local fish merchants. But Mr. Bleazard is not entirely satisfied with them and wonders whether it might not have been better to have bought specially made boxes in the first place.

This is how he put the position to me. "We have to put more nails in the fish boxes and each one has to have a piece of wire fastened round it to hold it together. Its total capacity is only $2\frac{3}{4}$ sq. ft. If I had used a specially made box it would have been much stronger, would have held about 6 sq. ft. and could have been moved by fork lift. The outlay might have been higher, but handling costs would have been cheaper".

Mr. Bleazard's point about handling costs is an important one. In common with many other growers, one of the biggest problems facing him is that of wages—he employs over 20 men and women.

Each of the converted chicken huts has six shelves in it. The shelves are approximately 22ft. long and $3\frac{1}{4}$ ft. wide.

Everything that is done on the farm is put on record, every crop being treated as if it were part of a trial.

Special emphasis is placed on hygiene and there is little trouble with disease at Mereside Nurseries at the moment. Mites were a problem at one time, but Mr. Bleazard reckons he cleared up this trouble by "cooking out" the houses.

Miners' lamps are used by the workers when they go into the converted chicken huts, as Mr. Bleazard does not like the idea of lamps with long lengths of high voltage cable being trailed along the wet concrete floors. He feels that the miners' lamps are much safer and give quite sufficient light to work by.

The accent at Mereside is on large mushrooms. "I would rather have $1\frac{3}{4}$ lbs. per square foot of this size than 2 lbs. of small ones", said Mr. Bleazard. "We cannot sell small mushrooms at a profitable price in the north."

Picking goes on every day of the year, Sundays, Christmas and other public holidays included.

All the mushrooms are sold in 3lb. baskets. They are picked up from the houses in trolleys and taken to the packing shed. After being packed they are placed in a cold room at a temperature of about 40 deg. F. Many of them are then delivered in the farm's own van to

A BUS ADVERTISES THESE MUSHROOMS—continued

Blackpool shops and restaurants. The bulk of the produce, however, is taken to the railway station for transportation to wholesale markets in Lancashire and Yorkshire.

Once Mr. Bleazard tried pre-packing mushrooms, but found the public would not pay the extra money for them. "We do not have sufficient supermarkets in the area to make it worth while", he commented.

Horse manure from local stables and racing stables in Yorkshire is used for preparing the beds. But a little poultry manure is mixed with it. "We get as much poultry manure as we want for 10s. a week from a poultry farm 100 yards up the road", he told me. Peat is obtained from Cumberland.

The horse manure usually arrives on Wednesdays. It is stacked, watered and then mixed with poultry manure. Eight days later it is turned and given another watering if this is necessary. Five days after this it is turned again and three days later it is turned for the third time—when gypsum is added. Finally, after another three days, the manure is put through a composter.

Converted manure spreader.

The composter is a converted manure spreader which has been raised to an almost vertical position. The big impellers at the end have been removed and a motor added. It can shift a 20-ton stack of manure in two or three hours.

Chips of mushrooms being taken from the growing houses in the background, to the packing shed.

Mr. Bleazard bought the composter for £100 at a farm sale in 1946 and the cost of conversion was £50. "We have to renew the driving chains about once a year, but it is surprising how it has stood up to the job", he said.

After the manure has been turned by the composter it is put into trays and taken to the peak heat room. The heat is supplied by means of 4in. pipes carrying hot water. The water itself is heated by a thermostatically controlled boiler run by an automatic stoker on washed singles. Mr. Bleazard believes that washed singles are cheap and satisfactory. "In fact, at £6 a ton", he said, "they are the cheapest fuel". He is converting the boiler for his growing sheds, however, from coke breeze to oil in order to get more constant and efficient temperatures.

Temperature in the peak heat room is taken to 140 deg. F., and maintained at about that temperature for two days. Eight days after the trays are filled they are spawned with manure spawn and left in the house for a further 18 days, this time at a temperature of 74 deg. F.



The trays are then taken to the growing sheds, where they are cased with a mixture of peat and ground limestone. The mushrooms start coming up three weeks later, and cropping goes on for 10 weeks.

The compost, after it is used, is sold to nurserymen and market gardeners in the Marton Moss area within six miles of the farm, at £1 a ton delivered.

After a house has finished cropping it is "cooked out". Steam is blown into the house, which has been sealed up. "We like to get the temperature above 140 deg. F." I was told. Steam is pumped for eight

hours then the house is opened up.

The following day the house is emptied, washed out and disinfected, while the trays are emptied, washed out and steam sterilised.

Mr. Bleazard faces the future, with his 24-year-old son, John, with confidence. John, who underwent a year's horticultural course at Lancashire Institute of Agriculture, has been with his father in the mushroom business for four years. Mr. Bleazard has full confidence in the future of the industry, but he believes that it requires a lot of capital and a large turnover, together with close attention to detail, to be profitable.

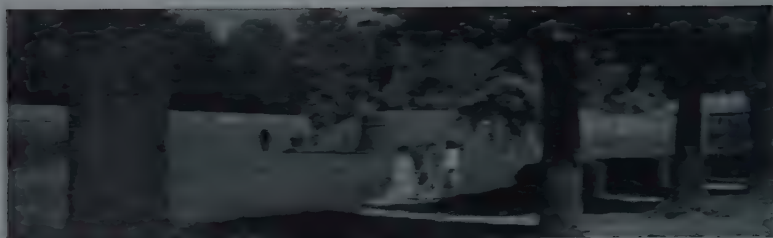
THE AUSTRALIAN MUSHROOM INDUSTRY GROWS UP

From very small beginnings in 1934, the Australian mushroom industry has now reached the stage of a primary industry with a gross annual output of about £400,000. Before 1950 the bulk of the cultivated mushrooms were sold at the Sydney Municipal Markets, with a few disposed of by contract or roadside stall. But from 1954 onwards the canners took an increasing cut of the cake, and production rose rapidly with a yield of about two million pounds in 1958.

Stable manure costs £5 to £8 per ton, baled straw £15 to £20 per ton, and labour averages about £3 a day. Cost of production is reckoned to be from two to three shillings per pound. On the other hand canneries and processors are paying from 3s. 6d. to 5s. 0d. per pound, including stalks, without special packing, transport costs or commission.

The mushroom industry in Australia is lagging about ten years behind the industry in the United Kingdom, but its future may deviate sharply in the direction of processing and canning. Growers have reached the point where it is no longer possible to compete by using any old growing houses—or no houses at all. They are building specialised mushroom farms on an increasing scale, and this sort of capital investment calls for more machinery and greater efficiency. Inevitably in the course of the next few years they will reach the point where supply outpaces unstimulated demand.

Surprisingly, supplies of horse manure have become increasingly difficult to obtain, with increase in cost. Other animal manures such as sheep, poultry and cow, have been used, and some growers are growing on synthetic composts.



• SHOW US THE DIFFERENT WALLS OF LUCCA

GROWING IN ITALY

by
John Henry

Recently we were visited by an old mushroom dealer from Lucca in a somewhat unusual town in Italy. His great knowledge of the very highest quality and his successful marketing for a specialized product, the demand for which far exceeds our ability to supply.

Mushroom farms have been started in many unusual structures but the farm of Lucca in Italy can lay claim to being perhaps the most original and ancient plant in the world. When Mr. Luigi Gianni approached the city council of Lucca in Northern Italy and asked if he could rent the city walls to start a mushroom farm they were amused and gave permission. Their amusement has given place to a respectful admiration for in three years he has established what must be the most ancient mushroom farm in Italy.

Lucca is an ancient city and its walls date from Roman times although the structures used by Mr. Gianni were constructed about 1548. They are more than 10 feet thick in places and were built to house the garrison troops and stores. When

Mr. Gianni took them over they had not been used for a century or more and the towers, battlements and bastions for the medieval troops were in an indescribable mess. It is not true however that he found a number of political prisoners of the medieval Doria family still chained to the walls.

Mr. Luigi Gianni is in partnership with his brother Lino and Mr. Bruno Baroni. Mr. Gianni has a home growing in mushroom cultivation in England before returning to his native Lucca to achieve his ambition to grow mushrooms of the very highest quality under modern conditions of cultivation.

The growing rooms inside the walls measure from 75 feet long by 10 feet wide, and the walls are sufficiently thick to provide adequate insulation and an excellent heating in-

GROWING IN ITALY—continued

required during growth. Clearing out the rooms of the rubbish of centuries was no easy business, and there are now four rooms in use. They are as clean and fresh now as any modern precast concrete structure, for the dank smell of centuries has been completely dispelled.

Mr. Gianni obtains stable manure for his composting yard, and adopts the method of three turns in the yard at six-day intervals. The compost is then ready for pasteurisation and is filled into trays each of five square feet. Pasteurisation is carried out using natural heat of fermentation remaining in the compost and boosted by hot water pipes, and the process lasts for a minimum of 24 hours.

The size of the growing rooms has already been mentioned, and each contains 500 trays or 2,500 square feet of compost. Additional air space between trays is provided by corner pegs. After pasteurising the compost is spawned with Darlington's 100% Productive Moist Manure Spawn specially transported to Lucca, for this has been found to give the standard quality of mushrooms that Mr. Gianni demands.

Casing is carried out with local soil, to which has been added 25 per cent. by volume of peat, and a little gravel to keep the soil open. A fine first break with even coverage of pinheads is Mr. Gianni's target.

He has paid special attention to ventilation in his growing rooms and has constructed a tunnel under the walls to bring fresh air into the rooms. Foul air is extracted at the same time, so that he has continuous circulation of air over the beds and no accumulation of carbon dioxide.

The trays are cropped for fourteen weeks during which a crop of 3½ to 4 pounds of mushrooms per square

foot are picked. This is a remarkably high yield and it may be due to the fact that, all mushrooms are picked in the very small button stage, when they are really little bigger than olives!

The market for mushrooms in Italy is quite different from that of the United Kingdom. Very few mushrooms are sold in greengrocers' shops and while there is a tremendous latent potential in Italy for fresh mushrooms, it has so far been hardly touched. It appears that in Italy most mushrooms are used in the preparation of food rather than as a separate item. If they are open the gills or any mature spores, cause discoloration of the finished dish. Consequently the demand is for tightly closed buttons and it is to this market that Mr. Gianni directs his efforts.

Perhaps the most interesting of his products are his bottled mushrooms, and these look really superb. Small button mushrooms are arranged in jars of olive oil containing special additives for preservation, and each individual mushroom is carefully placed in position in the jar. The result is both pleasing to the eye and stimulating to the palate. Sold under the brand name of Salpa, these *hors d'oeuvre* mushrooms go into delicatessen shops all over Europe and justly deserve the high price they fetch.

Another outlet for Mr. Gianni's mushrooms is the big American army base at Leghorn, some 20 miles away. He also sells through the markets in neighbouring towns, and his mushrooms supply many well-known restaurants in Northern Italy.

Mr. Gianni has complete faith in the future of his products and his confidence seems more than justified. Already he is finding himself

besieged with orders, orders that he cannot hope to fill until he has doubled the size of his plant. By then, he says, there will be a demand that will require still further expansion for the Italian people are rapidly becoming more mushroom conscious. Throughout Europe the standard of living is rising, and Italy is not lagging behind. Mushrooms, once the delicacy of the rich and of a few country folk, have become an

indicator of the rising tastes of the masses.

From the beginning, Mr. Gianni set himself a high target. His mushrooms were to be of the finest quality and this he has achieved. With the demand for his product outstripping supply it would have been human to lower his sights but he has not done so. His button mushrooms remain superb and he is determined to maintain this high standard.

THREE-PRONGED ATTACK CONTROLS FLIES

We think think mushroom growers will be interested in the following short note. As manufacturers of insecticides we are all for selling more of them, but there is such a thing as taking a sledgehammer to crack a nut !

Control of phorid and sciarid flies in a large American mushroom house is described by Frank S. Morishika of the University of California writing in *California Agriculture*.

The programme developed did not depend on chemicals or insecticides alone. Cultural and mechanical methods were taken into consideration and modified. The working area was cemented and periodically swept with a machine similar to a street sweeper. The surrounding areas were sprayed with dieldrin after the rubbish and weeds were removed. Deodorising chemicals were atomised into the air, high above the buildings, to cut down the odours arising from the composting piles.

These operations have decreased the number of flies attracted to the

compost piles and to the farm buildings, says the author.

The flies that entered the mushroom houses during the process of filling the benches were eliminated as the houses were closed tight and the compost was steam pasteurised. Diazinon slurry—with the consistency of very thick paint—was applied with a paint brush to doors and framings and around the vents while the houses were being cooled. The outside walls were thoroughly sprayed with diazinon at the rate of six pounds of the 25 per cent. wettable powder per 25 gallons of water, and the attics were dusted heavily with diazinon 2½ per cent. dust. These treatments were repeated every 10 to 14 days.

Inside the houses, the walls were sprayed with diazinon at the same dosage as used for the outside walls. Care was taken not to spray the mushroom beds. The slurry was also applied to the door and framing

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THREE-PRONGED ATTACK CONTROLS FLIES—continued

on the inside. In the case of a heavy infestation of phorids inside, the posts and baseboards of the beds were also painted with the slurry. It was necessary to open the bottom vents for air circulation. Cheese-cloth sprayed with diazinon and placed over the bottom vent openings to keep flies from entering the houses did not allow sufficient air circulation. Electric fly-screens installed in the vent openings gave satisfactory results.

Insecticides were not applied directly to the beds at spawning time because of unsatisfactory results obtained in preliminary experiments. Materials tested on the beds were: malathion, 25 per cent. wettable powder; diazinon, 25 per cent. wettable powder; diazinon, 2½ per cent. dust; trithion, 25 per cent. wettable powder; dipterix, 50 per cent. soluble powder; DDVP, 10.3 per cent. emulsifiable concentrate; dieldrin, 25 per cent. wettable powder; dieldrin, 5 per cent. dust;

DDT 50 per cent. wettable powder; DDT, 5 per cent. dust; methoxy-chlor, 25 per cent. wettable powder; lindane, 20 per cent. emulsifiable concentrate.

The dusts were applied at the rate of 1.5 ounces of active ingredient per 1,000 square feet and the sprays were used at 1 lb. of active ingredient per 100 gallons of water. The compost was thoroughly soaked.

All treatments were applied to the compost in standard mushroom trays just before spawning. Materials applied in this manner either inhibited mycelial growth or produced a few huge mushrooms, while normal mushrooms were produced in the controls.

This programme, combining cultural mechanical, and chemical methods of control, has proved very successful. Losses from flies and diseases have been held to the minimum. Furthermore, complaints from neighbours about flies and odour have decreased.

LONG-REACH THERMOMETERS

Growers today are taking a greater interest than ever in the temperatures reached in their compost heaps. Successful rapid composting demands close attention to these temperatures and the business end of the thermometer has got to reach right down into the heart of the heap.

Very long brass-cased instruments, three or more feet from tip to top, develop so much 'whip' that the mercury tube has a short life, and replacements are expensive. Standard 18-inch thermometers plunged into the heart of the heap, disappear from view, to reappear in contorted forms after passing through the manure turner.

At Heather Farm, Woking, an answer has been found that is both effective and ingenious. They use large numbers of the brass-cased thermometers with red ball end, 18 inches overall. But they unscrew the red ball and insert a brass rod which has been threaded to match the end of the case. This extension rod can be any length and if the other end is threaded internally, then the red ball end can be attached.

This extension allows the business part of the thermometer to be plunged into the heart of the compost heap and the extension rod and red ball indicate the position for quick withdrawal and examination to determine temperatures.

"The number of candidate compounds produced by a chemical company . . . may run into hundreds or even thousands per year . . ."

LOOKING FOR A NEW INSECTICIDE

Insecticides have become so vitally important in the world today that almost every new substance produced by the chemical industry is tested for insecticidal power. In this article, some details are given of the methods of searching for and testing new materials that may be of value as insecticides.

INSECTICIDES are used for the protection of man, his crops and his animals against insect pests when cultural or biological methods are inadequate or too slow to give prompt relief. The early insecticides were mainly inorganic poisons or materials of plant origin developed by the initiative of scientifically-minded individuals to meet their own particular problems.

Although often effective, the considerable agricultural expansion during the inter-war years has emphasised their limitations rather than their usefulness. In addition, the constant use of some of the more common inorganic materials over a considerable period has led to the development of resistant strains which are no longer controlled by economic dosages.

Consequently, by the end of the 'thirties, there was a considerable

demand for efficient, wide-spectrum insecticides which were cheap and safe to handle. This demand was partially met by the discovery of DDT in 1939 by Geigy and its subsequent rapid wartime exploitation. Since then a large number of synthetic insecticides with varying ranges of activity have been developed and to-day the insect poisons discovered number hundreds. However, only a small proportion of these can be marketed and the search for better insecticides still continues.

Three methods of research

There are several ways in which this search for new insecticides can be carried out. The first and most direct way is to prepare a large number of materials related to a known insecticide in the hope that one of them may be better than the parent, possessing a higher insecticidal action, a lower phytotoxicity or reduced mammalian toxicity. A

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LOOKING FOR A NEW INSECTICIDE—continued

second method is to investigate the vital biochemical or physiological processes of the insect and to devise a specific poison for one of them. A third, and probably the most widely used, is to examine as many different chemicals as possible in the hope that one will show some activity which can be exploited directly or further developed.

Since the number of candidate compounds produced by a chemical company actively engaged in the search for new insecticides may run into hundreds or even thousands per year, it is obviously not practical to use each new material in the field.

This would involve the chemist in a great deal of work, for even a small-scale field test requires a comparatively large quantity of chemical. On the other hand, the field entomologist would be carrying out tests on chemicals which in 99% of the tests would probably be ineffective anyway. The testing would also be very seasonal; months might elapse between the synthesis of a new chemical and obtaining the results of its performance, a particularly frustrating state of affairs for the chemist. In addition, the close co-operation of the pests would also be required, and, as most entomologists know, they are most unreliable.

The most efficient method

For these reasons the most efficient selection process, where a large number of compounds is involved, consists of a preliminary laboratory evaluation designed to eliminate useless materials, followed by field trials with only those compounds which have shown promise in the laboratory. The laboratory trials may be carried out against the actual pest species which it is desired to control or against a wide range of 'representative species'.

The first method has the advantage of giving a direct answer to a specific problem. On the other hand, it is possible that what could be a perfect acaricide might be rejected and forgotten because it had failed to kill locusts. The second method, although not providing a direct answer, does indicate the full potential of the compound and suggests lines of most promising exploitation.

The 'representative' insects chosen by various laboratories depends upon the facilities available and the degree of risk or omission accepted in the interest of testing a large number of materials. In general, however, the systems tend to include an aphid, a caterpillar, a spider mite, a fly and a beetle. The species of each is usually determined by such factors as ease in rearing, in handling during the experiments, and in availability of food.

Many economic pests are unsuitable test species, since their food cannot always be obtained continually through the year, whilst others have such complex or lengthy life cycles that they would require too great a share of the expensive laboratory space to rear them. For this reason most of the insect species used in the first-stage tests tend to be rather insects of convenience than of economic importance.

Three methods of attack

In devising methods of investigation due regard must be paid to the methods by which an insecticide attacks the insect. The techniques adopted must be as foolproof as possible to cover all practical eventualities if nothing important is to be missed. In general, an insecticide can be considered to enter the insect by three main routes:

LOOKING FOR A NEW INSECTICIDE—continued

- (a) Through the skin, feet or egg wall.
- (b) Through the breathing pores.
- (c) Through the gut.

Depending on such factors as the physical properties of the material, the structure and behaviour of the insect, one or other of these routes will be especially favoured. According to which is effective, the insecticide is classified as a contact, a fumigant or a stomach poison.

When testing a chemical for the first time the main object is to achieve the maximum insecticidal response. This is a particularly important consideration with completely unknown compounds, when even the slightest effect may be an important clue and a further simple chemical change may enhance the activity considerably. Thus, in the first tests, the dice are deliberately loaded very heavily in favour of the chemical. Experimentally, this can best be achieved by arranging that all main routes into the insect are attacked simultaneously.

In the case of the aphid, for example, the insects are sprayed with the chemical while they are feeding on the plants and the whole enclosed in a small glass cage. The treated insects are then left to breathe the fumes, to wallow in and feed on the deposit for about 24 hours, after which the kill is estimated. Similarly, caterpillars may be placed in small enclosed glass dishes to feed on cabbage leaves liberally dosed with a dust of the chemical for a period which is long enough for even a very slow-acting material to show some effect.

Four questions

If the compound fails to give any kill of one of the test species in this first crude gross activity test, then it is reasonably certain that it will

have little commercial value. If a kill is obtained, the next questions to be asked are: How did the chemical penetrate? By contact, fumigant or stomach routes? What is the minimum effective dose? How long will the chemical persist?

The question of the route is best answered by devising tests which allow only one factor to act at a time. A simple method of measuring contact action is to treat the insect by placing measured drops of the chemical dissolved in a volatile solvent on its skin. The drop is placed in such a position that the insect cannot ingest it, nor is it large enough to penetrate the breathing pores. A cruder, but quicker, technique is merely to spray the insects and place them on untreated food.

Fumigation activity can be quickly measured by placing the chemical and the insect together in a small enclosed space with a filter between them for a period of 48 hours. The fumes of the insecticide are able to reach the insect without the latter touching the chemical.

To measure pure stomach-poisoning action is a laborious procedure, since it involves feeding the chemical to the insect in such a way that only the mouth parts contact the chemical and there is no inhalation of vapour. Normally, a compromise has to be accepted whereby the food of the insect is treated and the insect is allowed to feed in the normal manner. In the laboratory, however, even this simple procedure is fraught with difficulties if a realistic result is required. During the tests it is obviously important for each group of insects to be confined to its own particular treated plant to avoid confusion between treatments.

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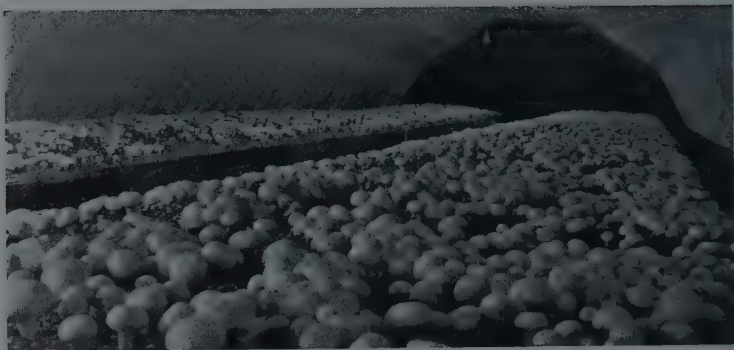
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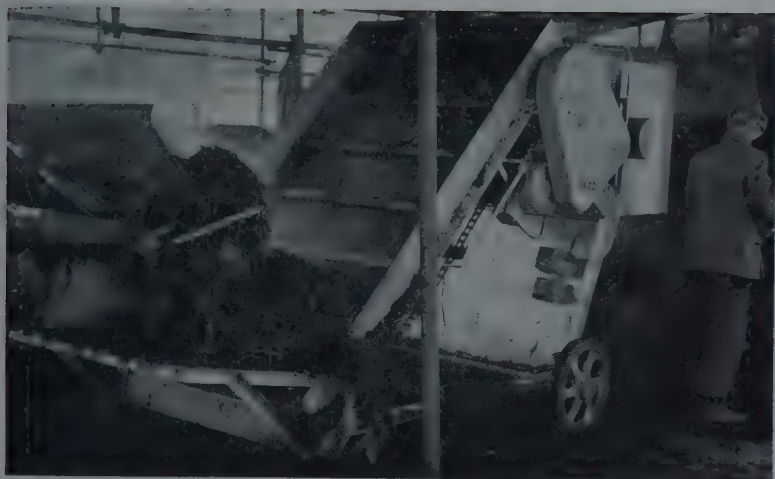
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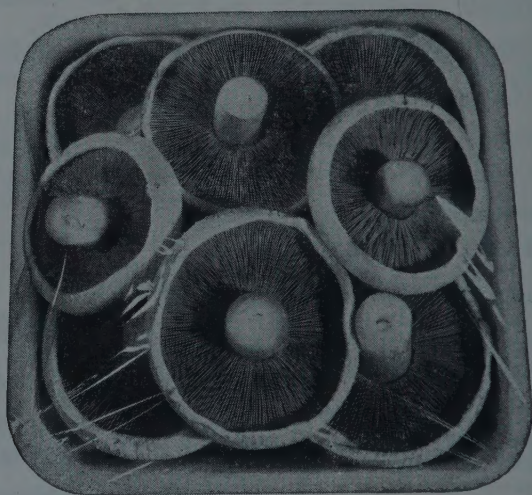
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Blackburn

SOMERS & GIBSON, LTD., Wholesale Market, Blackburn. Tel.: Blackburn 44956. Telegrams: Harty, Blackburn.

Covent Garden

BROOME & GREEN (LONDON) LTD., 27 James Street, Covent Garden. Tel.: Temple Bar 7856 Telegrams: Bourgaize, London.

CHARLES KNIGHTS, LTD., 501, 2, 3, 4, 5, Central Market. Tel.: TEMple Bar 5272, 9867,

Manchester

SOMERS & GIBSON, LTD., Smithfield Market, Manchester 4. Tel.: Deansgate 3666. Telegrams: Muscatel, Manchester.

FRED BRIDGE, Smithfield Market, Manchester 4 Tel.: Deansgate 4835 & 2802. Telegrams: Fred Bridge, Manchester. Established 1888

Sheffield

J. C. LUCAS & SONS, LTD., Castlefolds Market, Sheffield. Tel.: Sheffield 22618.

Spitalfields

CHARLES KNIGHTS, LTD., 220, 2, 3, Brushfield Street. Tel.: B1Shopsgate 6848/9.

Stratford

CHARLES KNIGHTS, LTD., 24, 25, 26, 27 Channelsea Road. Tel.: MARYland 2070.

Wolverhampton

H. GOODALL, LTD., Wholesale Market, Wolverhampton. Tel.: Wolverhampton 26661/2/3. Telegrams: Goodall, Fruiterers, Wolverhampton.

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